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erators, and its passage through the flues and reversing valves to the base of the chimney, commences at the heating chamber where the hydrostatic pressure is equal to that of the atmosphere. In order to draw the light gases downward to the bottom of the regenerator chamber, it is necessary to establish a negative hydrostatic pressure or draft depression at that level.

This is the function of the chimney, which, therefore, has a double purpose:

1. To draw the hot gases down to the bottom of the regenerator.
2. To impress upon them the necessary velocity and to overcome the losses of head due to changes in the direction of flow, changes in velocity and the friction against the walls of the flues, etc., in this portion of the furnace.

The computations for reverberatory furnaces, based upon the laws of hydraulics, were included, some time ago, among the obligatory exercises.for the students in the metallurgical section of the Polytechnic Institute of Petrograd; as a result of this, a very large number of these furnaces in the workshops of Russia have been recalculated. Ordinarily the problem, as given, involved the computation for furnaces actually in use within the different plants, based upon the daily consumption of fuel. The volume of producer gas being determined, the volume of the products of combustion was calculated. This was usually based upon a secondary air supply one and one-half times as great as the theoretical air supply. The analysis of these furnaces actually in service has shown the following:

3. That open-hearth furnaces of defective construction were subject to a rapid filling up of the regenerators, and for this reason served only during comparatively short campaigns;

the velocities were too great, and the hydrostatic pressure of the hot air and gases was barely sufficient to produce the necessary velocity. Sometimes these computations showed negative results, that is to say, the calculations showed that forced draft was necessary for operation of the furnace. But, nevertheless, the furnace worked without forced draft, though in a defective manner which caused trouble. It follows, therefore, that these methods of computation have in themselves a certain factor of safety.

4. The gas regenerators and the air regenerators should receive different volumes of the waste gases. In computing these two quantities of gas, it was found that the draft depressions necessary